

Chapter 5

Medieval Theories

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Early medieval Latin discussions of perception were largely influenced by Avicenna's *Liber de anima*. His description of the five external senses combined Aristotelian and Galenic medical ideas. Some medical views were also known through the *Pantegni* of 'Alī ibn al-'Abbās al-Mağūsī and the works of Costa ben Luca, Nemesius of Emesa and John Damascene. While Avicenna's approach also included the Neoplatonic conception of the soul as the active perceiver which uses corporeal instruments, this was not a central theme in his *De anima* and was rather known through Augustine's works. Aristotle's theory became dominant when his *De anima* was included in the university curriculum in the middle of the thirteenth century. Following Averroes, Latin Aristotle commentators were particularly interested in the nature of the medium change and the reception of the sensory species of the object without matter.

Aristotelian perceptual realism involved the teleological idea that the passive sensory powers and their extra-mental objects constituted a relational whole in which the objective perceptibility of things was actualized when the sensory qualities activated the corresponding sensory powers. This model was somewhat qualified though not refuted by the early fourteenth-century interest in the subjective reception of sensory content and the tendency to combine Aristotle's view of passive perception with various active elements.

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Avicenna distinguishes between five external and five internal senses. Physiologically speaking, external sense perceptions (other than that of smell) take place in the sensory nerves (1). These nerves join the sense organs to the front part of the brain, the seat of the common sense which as an internal sense combines the acts of external senses, thus making them perfect. Latin Aristotelians also hold that the common sense as the primary subject of perception distinguishes and synthesises between various sensory contents. They usually deviate from Avicenna in teaching that the perception of perception takes place in the common sense (2). For medieval discussions of the common sense, see also pp. 137–139.

It was a common medieval view that the changes of the sense organs and the medium are a necessary requisite for sense-perception. Thirteenth-century commentators on Aristotle's *De anima* argued that perceptions are actualizations of passive potencies – the senses are actualized by their objects, the sensible forms, which are in a special manner received by the sense organs and cause the sensory acts about objects (3). Most Latin writers assumed, like Aristotle and Averroes, that the sensory medium is changed in a non-perceptible manner by the sensory form and, furthermore, that there is a similar change in the sense organ when it receives the form. According to Averroes, the soul receives the 'intention' of the sensory form which has a 'spiritual' existence in the medium and in the sense organ. This terminology became dominant in the thirteenth century. The spiritual change brought the sensory forms into an activating contact with the sense-power – it was an axiom of Aristotelian physics that a passive power was activated by an active power only when these were in contact (4). The Averroistic view of the species in the medium was associated with the questions of optics by Roger Bacon and some other Latin authors – this interest was strengthened by the translations of Alhazen's *Perspectiva* and other optical treatises (5).

Augustine's Neoplatonic followers believed that perceptions, instead of being passive receptions, are apprehensions of physiological changes and their causes, having as content the exact likenesses which were formed by the soul without an external causation. This view was argued for by some influential early medieval authors and later by Robert Kilwardby, who presented it as a challenge to the Aristotelian theory (6). Averroes suggested that perceptions might be associated with an agent sense which is analogous to the agent intellect. Some Latin commentators followed Averroes, and it became increasingly usual to add some active elements, whether Averroist or Augustinian, to the Aristotelian theory (7). Even though the theory of spiritual change remained popular until seventeenth-century Aristotelianism, it was also criticised. In Ockham's view it is not less problematic to assume that an object directly activates a sense-power at a distance, without any mediation. Ockham's suggestion did not find many adherents (8). While the vision was the favourite sense in medieval philosophy, there was also some interest in other senses, sometimes beyond Aristotle's works (9).

Medieval Aristotelian realism involved the metaphysical conception of the formal sameness or likeness between the sensible form in the object and in the sensory power. New questions were associated with the perceiving subject. It was realised that the sameness of the species does not explain how the content of a sensitive act is present to its subject. Duns Scotus stressed the difference between receiving the

form and forming an intentional act with respect to an object. This added to the interest in misperceptions and various conceptual and subjective elements in perceptions (10).

1 Avicenna's Classification of External Senses

a. But the power which perceives is twofold: one power perceives from outside, another from inside. Those which perceive from outside are five or eight senses.

One of these is vision, which is a power located in the optic nerve for perceiving the form of that which is formed in the crystalline humour from the likenesses of the coloured bodies. These likenesses come through actually radiant bodies to the polished surfaces.

Another of these is sense of hearing, which is a power located in the nerve which is expanded over the surface of the optic nerve [better: ear-hole] for perceiving the form which comes to it from the movement of the air compressed between the striking and struck objects, the latter resisting the forced compression. This produces a sound, whose movement arrives in the still air stored in the cavity of the optic nerve [better: ear-hole] causing in it a similar movement which touches the nerve.

Yet another of these is smell, which is a power located in two protuberances of the anterior part of the brain, which are similar to the nipples of the breasts, for perceiving that which the inhaled air transfers from the odour. This is either in the vapour mixed with air or imprinted in the air by virtue of the change which the odorous body causes.

Yet another of these is taste, which is a power located in the nerve which is expanded over the body of the tongue for perceiving the tastes, which are released from the bodies touching it when they are changed by a mixture with the saliva of the tongue.

Yet another of these is touch, which is a power located in the nerves of the skin and flesh in the entire body for perceiving that which touches it and affects by means of a contrariety which changes the mixture and the affection of the composition. Some authors think that this power is not the most special species, but instead a genus of four powers or even more, which are all distributed in the entire body. One of these perceives the contrariety between warm and cold, the second between dry and moist, the third between hard and soft, and the fourth between rough and smooth. However, since these are all gathered in one instrument they are considered as being essentially one. (Avicenna, *Liber de anima* I.5 (ed. van Riet, 83–85))

b. Notice that there are nerves descending from the anterior part of the brain with the sensory spirit and being perfected in their extremes; for example, one of the nerves descending from the anterior part ramifies so that from the extremes of these branches there are formed pupils and the disposition of the eyes which are the organ of vision. (John of la Rochelle, *Summa de anima* II.93 (234–235))

c. Vision takes place through two concave nerves which are called optic nerves, and through these two nerves the animal spirit is moved from the first ventricle of the brain to the eyes, where these are affected by the visible as a colour and then return to the fantastic part, bringing the species of the colour to the soul. (Anonymous, *Sententia super II et III De anima*, ed. Bazán, II.14 (161))

Avicenna's classification (a) is also found in *Kitāb al-naǧāt*; see Rahman 1952, 26–27. In the Latin translation the word 'ear-hole' is mistakenly rendered 'optic nerve'. For the Latin reception, see Dominicus Gundissalinus, *De anima*, 68–9; John Blund, *Tractatus de Anima* 9 (24); 12 (39); 14.1 (51); 15 (56); 16 (58); John of la Rochelle, *Tractatus* II.1.4 (73–74); Peter of Spain, *Scientia libri De anima* VI.6 (219); Albert the Great, *De homine* 19.1 (166), 23 (228); 28 (254); 32.1 (272–273); 33.1 (281–283); further references in Hasse 2000, 244–246. Similar approaches based on ancient medical theories were also known through Nemesius of Emesa, *De natura hominis* 6–10 (for example in Albert the Great, *De homine* 19.1 (165a)), John Damascene, *De fide orthodoxa* 32 (for example in John of la Rochelle, *Summa de anima* II.68), the *Pantegni* (for example in William of St. Thierry, *De natura corporis et animae* I.39–46) or Costa ben Luca, *De differentia spiritus et animae* (ed. Wilcox, 151–162) (for example in Anonymous, *Lectura in librum De anima*, ed. Gauthier, II.25 (421)).

In distinguishing the senses, Avicenna concentrates on the five external organs and the sensory nerves which form the bodily machinery which receives the forms of sensible things. External objects are then perceived by the faculty of perception. The fine corporeal animal spirit in the nerves is a mediator between the sensory faculty of the soul and the bodily organs. For the soul using organs and the spirit, see Avicenna, *Liber de anima* II.2 (ed. van Riet, 120–130); V.7 (ed. van Riet, 164–166); V.8 (ed. van Riet, 175–185); for Avicenna's view of the soul and perception in humans and animals, see Kaukua and Kukkonen 2007; for vision, see Hasse 2000, 107–127. The nerves and the spirit are discussed in the *Pantegni* and the texts of Nemesius of Emesa and Costa ben Luca mentioned above. In authors who employ the medical spirit model, the animal spirit moves from the brain to the nerves and the sensory imprints in the nerves somehow proceed to the foremost part of the brain, which is the seat of the common sense (b–c); see also John of la Rochelle, *Summa de anima* II.97 (240–241); Albert the Great, *De homine* 19.1 (166a); Anonymous, *Lectura in librum De anima*, ed. Gauthier, II.25 (421–422); Peter of Spain, *Scientia libri De anima* VI.6 (216–219); Robert Kilwardby, *De spiritu fantastico* 164.

2 Common Sense and External Senses

a. This power is called the common sense, the centre of all the senses from which they derive like branches and to which they return, and this is what actually senses. (Avicenna, *Liber de anima* IV.1 (ed. van Riet, 5))

b. The form which is seen is imprinted again in the spirit which carries the power of the common sense, and the common sense receives that form, and this is the perfection of vision. The power to see is outside the common sense, although it emanates from it. I want to say that the power to see sees and does not hear or smell or touch or taste, but the common sense sees and hears and so on. (Avicenna, *Liber de anima* III.8 (ed. van Riet, 269))

c. The sensory power is spread to the organs of the five senses from one common root; the sensory power proceeds from this to each organ, and the impressions of particular organs are terminated at this ... This common sensory principle can simultaneously apprehend several things, as far as it is considered twofold as terminating two sensory impressions, but as far as it is one, it can discern the difference between one and the other. (Thomas Aquinas, *Sentencia libri De anima* II.27 (185))

d. Some people think that these common sensibles have a sense in animals in which they come and by which they are apprehended. But this is not true (Avicenna, *Liber de anima*, III. 8 (ed. van Riet, 283))

Like Aristotle, Avicenna assumes that there is an ultimate centre of perception which somehow makes various perceptions perfect (**a**, **b**). The perfection means that the perception is integrated in a larger perceptual content. The differentiating and unifying sensory centre is assumed by most Latin authors in the same way as does Aquinas (**c**). While Avicenna criticises the view that Aristotelian common sensibles would be perceived by one special sense (**d**), Averroes holds that the common sense has the common sensible as its proper objects (*Commentarium magnum in Aristotelis De anima libros* II.63–65 (225–229)). Medieval authors usually interpret the common sensibles, as distinct from the proper objects of the senses, as objects of several senses. See Anonymous, *Lectura in librum De anima*, ed. Gauthier, II.24 (413–415); Anonymous, *Quaestiones in De anima*, ed. Giele, II.14 (90–91); Anonymous, *Quaestiones in De anima*, ed. van Steenberghen, II.21 (233). Thomas Aquinas puts forward the common opinion: ‘It is false that these common sensibles are the proper objects of the common sense’ (*Sentencia libri De anima* II.13 (119)).

While some commentators of *De anima* take Aristotle to mean that the perception of perception is imbedded in the acts of particular senses as the sensory awareness of actual perceiving or its absence (Aquinas, *Sententia libri De anima* II.26 (178–180)), the majority understand him to mean that this is a separate common sense act about particular sense acts, as Aquinas also does in *Summa theologiae* I.78.4, ad 2; see also Anonymous, *Lectura in librum De anima*, ed. Gauthier, II.24 (410, 416); Anonymous, *Quaestiones in De anima*, ed. Bazán, II.39 (463); John Buridan, *Quaestiones in De anima* II.22.

In dealing with the question of the physiological seat of the common sense, early medieval thinkers usually follow the brain-centred view of cognitive functions in Nemesius of Emesa, *De natura hominis* 7, Augustine, *De genesi ad litteram* VII.13, 17 (212, 214), *Pantegni* XIV.19, or Avicenna, *Liber de anima* V.8 (ed. van Riet, 176.76–181.54). Avicenna attempts to reconcile this with Aristotle's heart-centred view by arguing that the spirit which functions in the brain is first generated in the heart; see his *Canon* I.1.6.1; cf. Averroes, *Compendium libri Aristotelis De somno et vigilia*, ed. Shields, 84–85; *Colliget* II.29, 31–32. After the Aristotle reception in the middle of the thirteenth century, the brain-centred consensus is somewhat undermined; see, e.g., Anonymous, *Quaestiones in Aristotelis De anima*, ed. Bazán, II.40 (464–465). The brain-model is accepted by Pietro d'Abano who discusses the topic as one of the controversial questions of his time (*Conciliator*, d. 38, f. 58vb–60ra, d. 41, f. 63ra–b). Buridan argues for the Aristotelian heart-centred view (*Quaestiones in De anima* II.24) and finds some adherents among philosophers, but there are also supporters of the brain-model which is dominant in the Renaissance time. For the heart-brain controversy, see Knuuttila 2008, 12–14; Siraisi 1987, 515–524.

3 Sense as a Passive Power

a. Senses, however, are passive potencies of a certain kind, having the nature of being changeable by external sense-objects. The external cause of this change is what is *per se* perceived by the senses, and sensory powers are distinguished according to the diversity of that cause. (Thomas Aquinas, *Summa theologiae* I.78.3)

b. Everything that is perfected from potency to act by something which causes its transmutation and change is a passive potency, since it is the nature of a passive potency to be a principle of being changeable by something else. Senses are like this, for they are receptive of species without matter, as clay is receptive of the form of a signet without bronze. (Anonymous, *Quaestiones in De anima*, ed. van Steenberghen (225))

c. First, then, he remarks that being affected is spoken of not in one way but in many ways, just as potentiality and actuality are spoken of not simply but in many ways. Being affected is in one way spoken of with respect to a corruption caused by a contrary, for being affected, in the proper sense, seems to imply a loss of something to the patient through its being overcome by the agent ... In another and less proper way, being affected is spoken of as implying a kind of reception. And as a receiver is to what it receives as potentiality is to actuality, and actuality is the perfection of a potentiality, so being affected is not spoken of in this way with respect to any corruption in what is affected, but more with respect to a kind of preservation and perfection of what is potential through what is actual. (Thomas Aquinas, *Sententia libri De anima* II.11 (111–112))

d. What each of these are in actuality, for example, how a colour is in actuality when it is perceived by a sense, and the same with taste and other sensory objects, is explained in *De anima*, that is, how each of these is the same as or another than a sense in actuality, such as vision or hearing, for the visible in actuality is the same as the vision in actuality, but the visible in potentiality is not the same as the vision in potentiality. (Thomas Aquinas, *De sensu et sensato* 6, n. 79)

Mid-thirteenth century Aristotelians regarded perceptions as actualizations of passive sensory potencies activated by external objects (**a**, **b**); see also Anonymous, *Sententia super II and III De anima*, ed. Bazán, II.11 (126–130); *Lectura in librum De anima*, ed. Gauthier, II.10 (272, 276–277); Peter of Spain, *Scientia libri De anima* VI.9 (230–231); Peter of Spain (pseudo), *Expositio libri De anima*, II.5 (162–170); Albert the Great, *De homine* 34.1 (295–297); Albert the Great, *De anima* II.3.1 (96.36–97.51); II.3.2 (99.35–99.87); II.3.6 (107.40–82); the anonymous *Quaestiones in Aristotelis De anima*, ed. Giele, II.11 (85–88); the anonymous *Quaestiones in Aristotelis De anima*, ed. Bazán, II.15 (427–428). The senses could be divided by referring to the nature of their primary activators or proper objects, these being the same in Aristotelianism (*De anima* II.5, 417b20–21); see also **4** below. Commentators usually paid attention to Aristotle's remark in *De anima* II.5, 417b2–7 that the actualization of potency as such differs from standard qualitative changes in which the birth of the new quality involves the destruction of an earlier quality (**c**): see also Peter of Spain (pseudo), *Expositio libri De anima*, II.5 (166–167). Following Aristotle's remarks in *De anima* III.2, some commentators taught that when a perceptible form actualizes a passive sensory power, its possibility of being perceived is actualized at the same time as the power is actualized. This actualization of the potential perceptibility takes place in the perceiver and not in the object which is potentially perceptible (**d**);

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see also Thomas Aquinas, *Sententia libri De anima* II.26 (179–180); Peter of Spain (pseudo), *Expositio libri De anima* II.14 (266–267). Many authors remarked that even though perceptions are acts of externally actualized passive powers, as activities they can be regarded as discriminations of forms and in this sense active; see, e.g., Anonymous, *Sententia super II and III De anima*, ed. Bazán, II.11 (126); Anonymous, *Lectura in librum De anima*, ed. Gauthier, II.10, 277; Albert the Great, *De anima* II.4.2 (150.60–151.7).

4 Spiritual Change and the Species in the Medium

a. What he said about vision, namely, that the intermediate nature which serves vision is not air as air or water as water but a common nature, is to be understood here, too ... In the same way as colour has a twofold being, i.e., being in a coloured body which is corporeal being and being in the transparent which is spiritual being, smell too has a twofold being, namely, being in the odorous body and being in the medium. The former is corporeal being and the latter spiritual being; the former is natural and the latter extraneous being ... Nevertheless, it seems that the being of colour is more spiritual than the being of smell, for winds are seen to carry smells, and for this reason smell was assumed to be a body. But smell is like sound in this regard. Sound comes into being from a passion in air, but it is also impeded by winds. Yet it does not follow from this that it be a body. (Averroes, *Commentarium magnum in Aristotelis De anima libros* II.97 (276–278))

b. The forms are in the medium in a way which is between spiritual and material being, for the forms outside the mind have a purely corporeal being, and the forms in the soul have a purely spiritual being, and the forms in the medium have a being between material and spiritual being. (Averroes, *Compendium libri Aristotelis De Sensu et sensato* (31–32))

c. That which receives that power which is an intention separated from matter is that which primarily senses. When this has received that, they are made the same, though they differ in number. (Averroes, *Commentarium magnum in Aristotelis De anima libros* II.122 (318))

d. Now, the change is of two kinds, one natural and the other spiritual. A natural change takes place when the form of the cause of change is received in the thing changed according to its natural being, as heat is received in the thing heated. A spiritual change takes place when the form of the cause of change is received in the thing changed according to its spiritual being, as the form of colour is received into the pupil which does not thereby become coloured. For the operation of the senses,

a spiritual change is required whereby the intention of the sensible form is produced in the sense organ. Otherwise, if a natural change alone sufficed for perception, all natural bodies would perceive when they undergo alteration. But in some senses there is a spiritual change only, as in sight, while in others there is not only a spiritual but also a natural change, either on the part of the object only or likewise on the part of the organ. (Thomas Aquinas, *Summa theologiae* I.78.3)

e. When vultures sense the smell of a carcass at a distance of fifty miles or more, it is impossible for any corporeal evaporation from the carcass to be diffused over so great a space, especially since a sensible object alters the medium for the same distance in all directions, unless hindered. But even if the whole carcass were to dissolve into an odorous evaporation, this would not be enough to occupy so much space, for there is a definite limit of rarefaction for a natural body, namely the rarity of fire, and especially, the carcass does not appear to be sensibly altered by this kind of smell. Therefore, we should say that while a smoky evaporation may come from an odorous thing, it does not reach as far as where the smell is perceived; rather beyond the point reached by this evaporation the medium is altered spiritually. Such spiritual alteration is produced by the object of vision more than by that of the other senses because visible qualities are in perishable bodies in virtue of what they have in common with imperishable bodies; therefore they exist in a more formal and noble manner than do the other sensible qualities, which are proper to perishable bodies. (Thomas Aquinas, *Sentencia libri De anima* II.20, 64–88 (152–153))

A non-perceivable change of the medium is required for bringing the sensible form to an activating contact with the sense organ and the sensory faculty (**d**). The most influential model for this procedure is offered by Averroes's theory of the spiritual transmission of the sensible form. Averroes calls the transmitted forms 'intentions' (ma'nā) because they involve the sensible aspect of the object form. He taught that sensible forms have a material being in sensible objects, a more spiritual being in the medium and merely spiritual being in the soul. Like in Aristotle, the perceptibility of an object is actualized in the sensory act, although these differ in number (**a–c**). See also **3d** above.

Many authors interpreted the idea of the modes of spiritual being as referring to the various degrees of the form's being freed from matter and corporeity; see *De potentiis animae et obiectis*, ed. Callus (152.11–20); Anonymous, *Sententia super II and III De anima*, ed. Bazán, II.12 (142); II.20 (252); Anonymous, *Lectura in librum De anima*, ed. Gauthier, II.26 (402, 404); Peter of Spain (pseudo), *Expositio libri De anima* II.7 (184); II.8 (197–9); II.10 (220); II.11 (238–240); II.12 (249–250); *Quaestiones in Aristotelis De Anima*, ed. Steenberghen, II.37 (278–280); II.42 (292). Thirteenth-century commentators on Aristotle mostly assumed that the visible forms in the medium somehow retained their corporeal nature, as Albert the Great described

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Averroes's view (*De homine* 21.5 (207a)). However, Albert himself and Thomas Aquinas strictly separate the spiritual mode of being from the natural one and from perceivable natural effects (**d**); see also Albert the Great, *De anima* II.3.6 (107.56–82); Thomas Aquinas, *Sentencia libri de anima* I.10 (50); II.14 (128); II.24 (169). In Aquinas's *Quaestio disputata de anima* 13, the terms 'material' and 'immaterial' correspond to the distinction between 'natural' and 'spiritual' in (**d**). The spiritual change of the medium and the sense organ caused by visible objects is different from that associated with other objects because the latter ones, as distinct from visibility, are accompanied by various physical changes of the medium, such as vibration of the air (hearing), evaporations (smell), changes of the liquid (taste) and physical changes of the flesh (touch). While the organs of sight, hearing, and smell are not naturally changed in sensing, the organ of touch and taste is also naturally changed (*Quaestio disputata de anima* 13; *Summa theologiae* I.78.3; section **9** below). In discussing an example from Averroes's commentary on *De anima* II.97 (277–278), Aquinas argues that the merely spiritual change of the medium by the visible forms shows that lower corporeal things are to some extent endowed with a power of non-corporeal causation of heavenly bodies, for example, the illumination of the air by the sun (**e**). Elsewhere he suggests that they may have some powers similar to those of separate substances (angels); see *Quaestio disputata de potentia* 5.8; cf. Peter of Spain (pseudo), *Expositio libri De anima* II.7 (180); II.11 (238–240); II.12 (278–279). Albert the Great does not draw a distinction between the spiritual and intentional existence (*De anima* II.3.8 (110)); later it was more common to speak about the spiritual existence of which there continued to be various opinions. See, e.g., Buridan (?), *In Aristotelis De anima quaestiones*, ed. Patat, II.18; for Averroes, see Ivry 2008a; for Albert, see Dewan 1980; Steneck 1980; for Aquinas, Tellkamp 1999, 81–129. For medieval criticism of the species theory, see section **8** below.

5 Optics and Vision

a. About the multiplication of this species, one should understand that it is located in the same place as the species of the seen thing, namely between the vision and the seen thing. It takes place as a pyramid, the vertex of which is in the eye and the base of which is on the seen thing ... although the species of the eye has the form of a pyramid, the vertex of which is in the eye and the base of which is on all parts of the seen thing, from the surface of the glacial humour proceed still an infinite

number of pyramids. They all have a common base, and their vertices are on the singular points of the seen thing, so that all parts of the visible object are to be seen as powerfully as possible. However, one pyramid is the principal one, namely, that whose axis is the line passing through the centre of all parts of the eye, which is the axis of the whole eye, since that line certifies everything. (Roger Bacon, *Perspectiva* I.7.4 (106))

b. A species is not a body and it is not moved as a whole from one place to another, but that which comes to be in the first part of the air is not separated from the air, since the form cannot be separated from the matter in which it is except in the case of the soul. Instead, it produces its likeness in the second part of the air, and so on. Therefore, there is no local motion, but a generation which is multiplied in the different parts of the medium. And it is not a body which is generated there; it is a corporeal form which does not have dimensions of itself but comes to be under the dimensions of the air; and it does not come to be by flowing out of the from luminous body but by eliciting out of the potentiality of the matter of the air. (Roger Bacon, *Perspectiva* I.9.4 (140))

Roger Bacon attempts to combine the Averroistic view of the species in the medium and Alhazen's theory of vision and perspective (**a**). (See Tachau 1988, 3–39, particularly 22–23.) Bacon explains that the multiplication of the species, as the spiritual medium change was often called, takes place on a corporal substrate (**b**). Bacon uses the geometrical model of Alhazen to explain how vision takes place in the eye. The one-to-one correspondence between points on the surface of the visual objects and those on the surface of the sensing organ, the crystalline humour, was explained by means of the rays of light which originate in the object and encounter the cornea and the anterior surface of the crystalline humour perpendicularly. These non-refracting rays were thought to be stronger than oblique rays and capable of forming a stronger image in the crystalline lens (see Alhazen, *De aspectibus* I.5). Bacon even attempts to show that the oblique rays refract in a manner that all the rays emitted from one point convene in one point of the crystalline lens and in this way contribute to the formation of an image (Bacon, *Perspectiva* I.6.2). On requirements for veridical seeing, see Alhazen, *De aspectibus* I.7.36–42; Bacon, *Perspectiva* I.8.1–3; I.9.1–4; II.2.1–4. See Lindberg 1996.

6 Augustinian Active Sense

a. Two motions come together as if from opposite parts in sensing. One motion proceeds from a sensible thing which causes an alteration, and through the medium this enters to the sense organ and its innermost part where it is united with the sensory soul. The other motion proceeds from the sensory soul to meet the affect which is

produced in the sense organ. In the meeting of these motions, an image of a sensible thing is formed in the sensory soul by the action of the sensory soul which attends to its sense organ, and by means of this image a thing is sensed. (Robert Kilwardby, *De spiritu fantastico* 112)

b. You will have some kind of simile for understanding this if you assume that there is a seal in front of wax so that it touches it and that the wax has a life by which it turns itself towards the seal, and by pressing itself against it, makes itself like it; by turning its vision upon itself it then sees in itself an image of the seal. In this way the sensory spirit, by turning itself more attentively to its organ, which is informed by a sensible species, makes itself like this, and by turning its own vision upon itself it sees oneself as such. In this way it senses an external sensible object by means of the image which it has formed in itself.

The image in the organ or the organ informed by the image is the cause without which the image does not come to be in the sensory spirit. However, it is not its efficient cause, for the action of the sensible thing or of its image does not ascend beyond the limits of corporeal nature; having reached the innermost part of the organ it stays there. But when the sensory spirit, which presides over the organ, is directed towards its affects and flows more attentively into the organ which is thus affected, it goes through it everywhere, co-mingles with the spiritual image, and makes itself similar to it. (Robert Kilwardby, *De spiritu fantastico* 103)

Regarding Augustine as ‘much more sublimely illuminated than Aristotle, particularly in spiritual matters’ (*De spiritu fantastico* 98), Robert Kilwardby tries to combine the Aristotelian passive view (see **3** above) and Augustine’s active view of perception by associating the former with the physiological processes and the latter with the immaterial soul’s forming exact likenesses of external objects on the basis of its attention to the body. Sensible things are perceived through these likenesses which are not externally caused (**a–b**). Kilwardby is more explicit than Augustine in arguing that the content of perception is the image formed by the soul (cf. Silva 2012, 131–176; for Augustine, see pp. 51–54 above.) For the active sense, see also **7** below. The anonymous twelfth-century author of the *Liber de spiritu et anima* writes: ‘There certainly is some kind of spiritual nature in us where the likenesses of corporeal things are formed and held when formed, either when we are in contact with present things by one of the bodily senses and the likeness of these is continuously formed in the spirit and stored in the memory or when we think about known or unknown absent things to form some kind of spiritual understanding ... These images in the spirit are not formed by the bodies seen, nor do they have power to form anything spiritual. Instead they are formed with admirable speed by the spirit in itself, as an intellectual and rational spirit’ (23, 24, PL 40, 796, 798; cf. Augustine, *De genesi ad litteram*

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XII.16 (402.10–15). An awareness of the likenesses in the soul was called imagination – perception was this activity with the addition that it involved an awareness of the actuality of the object (*Liber de spiritu et anima* 11, PL 40, 786). For the Augustinian terms referring to the activity of the soul in perception (*attentio, intentio*), see William of Saint Thierry, *De natura corporis et animae* I.109; *Liber de spiritu et anima* 24, PL 40, 797; Robert Kilwardby, *De spiritu fantastico* 102–103, 111–112, 123. The Augustinian tradition influenced Peter John Olivi who developed an intentionalist theory of perception without inner representations (Silva and Toivanen 2010); see also **10** below.

7 Averroist Agent Sense and Other Theories of Passive and Active Aspects

a. And one might say that the sensible objects do not move the senses in the way in which they exist outside the soul, for they move the senses inasmuch as they are intentions, but in matter they are not actually, but only potentially intentions. And one cannot say that this variety results from the variety of subjects so that these become intentions because of the spiritual matter which is the sense and not because of an external mover, for it is better to hold that the variety of forms is the cause of the variety of matter, and not to hold that the variety of matter is the cause of the variety of forms. Accordingly, it is necessary to postulate an external mover in the senses, other than the sensible object, just as it was necessary in the intellect. We have seen, therefore, that if we grant that the variety of forms is the cause of the variety of matter, it is necessary that there be an external mover. Aristotle did not speak about this with respect to the sense because it is obscure, whereas it is obvious with respect to the intellect. You should think about this because it requires examination. (Averroes, *Commentarium magnum in Aristotelis De anima libros* II.60 (221))

b. Similarly, we do not say that the sensory potency which receives a sensation is in itself primarily and directly affected by the sensible object itself, although its becoming actual presupposes the actualization of a certain potency which is in itself passive or capable of being affected by the sensible object, and when this potency is actualized by the activity of the sensible object, in the same instant of time the agent sense causes sensation in the passive sense which is disposed in a certain way by the species. And in this way, we interpret all authorities who state that the sensible object moves the sense from potency to act: not that the sensible object or its species caused by the object efficiently causes sensation or directly and per se acts on the sensory potency, but because it produces its species in the sense organ which is the disposition of the passive sense for receiving sensation. (John of Jandun, *Sophisma de sensu agente*, ed. Pattin (140–141))

c. Therefore I accept the agent sense which, I believe, actively forms sensation in itself ... While the soul is the principal formative cause of perception below God, it is not sufficiently actual for this without the sensory species – however, the composition of the soul and the sensory species is already sufficiently actual for this, as is said in the third book about the intellect and its act. For when having the first act with proper dispositions it can bring itself to the second act, provided that there is no hindrance. (John Buridan, *Quaestiones in De anima* II.10 (156, 158–159))

d. However, no sensation takes place by an external sense alone; rather the soul or its internal faculty is always more fundamental. Therefore colour, sound, local motion, heat, or any other sensible thing is not perceived unless the internal faculty actually pays attention and considers it. Therefore you see that neither heat nor other similar things [are perceived] in a trance or when the mind or the internal faculty suffers from illness, as is seen in lethargy. I repeat this often because it is of basic importance. (Nicole Oresme, *De causis mirabilium* 3.3, 109–114)

e. That which produces is always nobler than that which receives ... The power of the soul necessarily and per se presupposes something nobler than what the sensible species presupposes in its subject, for while the power of the soul presupposes the soul as its subject, as everybody agrees, the sensible species necessarily and in itself presuppose neither the soul nor anything nobler than the soul nor as noble as it. (John of Jandun, *Sophisma de sensu agente*, ed. Pattin (130–131))

Averroes seems to say that there should be an active power which transforms the species in the medium into non-corporeal activators of the sensory powers (a). Giles of Rome argued that spiritual species are brought about by the influence of higher spheres; hence there is an active power associated with sensory acts, other than the sensible objects, but it is not an active sense (*Quodlibet* II.12, ed. in Pattin 1988, 5–7); a similar argument was put forward by Peter of Auvergne (ed. in Pattin 1988, 9–15); see also Peter of Spain, *Scientia libri De anima* VI.9 (232). For a critical discussion of Averroes's view and other arguments for the activity of senses, see Albert the Great, *De anima* II.3.6 (104–107). Averroes's idea was also criticized in the anonymous *Lectura in librum De anima*, ed. Gauthier, II.10 (279), and the activity of senses in general in Aquinas, *Sentencia libri De anima* II.27 (186.226–228); for other critics, see Pattin 1988, 7–8. Many later thinkers explained that while the reception of the form in the organ is merely passive, this is necessary but not sufficient for activating the non-material sensory power – its activation takes place by the activity of the soul, as John Duns Scotus explains in his *Quaestiones in De anima*, 12 (106). This view was associated with Averroes's remark about agent sense by John of Jandun (b) in a controversy with Bartholomew of Bruges who argues that Aristotle and Averroes regard

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senses as passive. The texts are edited in Pattin 1988. Buridan and his followers accepted some versions of the active sense (c). Like Buridan, many writers maintained that the presence of the sensible species transforms a sensory faculty into a higher level of actuality, after which the faculty may proceed to a second act, the actual sensation. The theory of the degrees of potentiality and actuality, also mentioned by Scotus, derives from Aristotle (e.g., *De anima* II.5); Aristotle does not apply this to the activity of the sense in the way Buridan and many others do. The activity of the soul in perception could be characterised by using traditional Augustinian terms (intention or attention), as in Nicole Oresme (d); see also his *Quaestiones in De anima* II.8–9. In his defence of the activity of the sense John of Jandun argues that since corporeal species is less valuable than animated things, it is not possible that a sense-power is activated by the causal influence of the species (e). It was a widely accepted Augustinian idea that the body cannot affect the soul; see, for example, Robert Kilwardby, *De spiritu fantastico* 52. See also p. 53 above.

8 Medieval Criticism of the Species Theory

a. There is no necessity to postulate species in the medium which would be of a different nature than the objects which produce them. This is so because these species could not be perceived by any sense, and therefore should not be postulated except on the basis of reasons deduced from principles known in themselves or from experience. If there were a reason for this, it would seem to be that the mover and the moved are simultaneous by contact, for this is the reason by which the Commentator argues for the species. But we have shown above that a thing can cause a change at a distance without changing the medium. (William of Ockham, *Quaestiones in librum tertium Sententiarum* 2 (OTh 6, 59–60))

b. The object of intuitive cognition, whether sensory or intellectual cognition, is not constituted by a being which would be something between the object and the act of cognition. I maintain that the object itself is immediately seen or apprehended without anything between it and the act. (William of Ockham, *Scriptum in librum primum Sententiarum* 27.3 (OTh 4, 241))

c. Moreover, a species would never actually represent the object to the power itself unless the power saw it by directing and fixing its vision on it. But the thing toward which the vision of the faculty is directed has the nature of an object, and the thing toward which it is first directed has the nature of the first object. Therefore, these species would have the nature of an object rather than that of an intermediate or representative principle ... so we would always know the species before the real object itself. (Peter John Olivi, *Quaestiones in secundum librum Sententiarum* 58 (II, 469))

d. Note that some people are hardly willing to perceive any action except local motion, like push and pull and so on, or the action of the primary qualities, for they do not want to imagine how the sensible thing alters the medium and the medium the organ and how the cognitive power then perceives and as it were touches the sensible thing and becomes one with it, as Aristotle explains in *De anima*, Book 2, and in *De sensu* etc. Therefore, just as a spider who is sitting in the corner of the web instantly perceives many things by a thread or threads, etc., so also the soul, which is located in the heart according to Aristotle ... knows and perceives different objects by different organs, some of these more spiritually and others less so. (Nicole Oresme, *De causis mirabilium* 3.3, 97–106)

Ockham argues that the species are associated with various problems and are not needed for causing the actualization of sensory powers because this could be as well explained by action at a distance (**a**). He also argues that the postulation of the species in the medium implies that one perceives these species rather than the objects themselves, thus undermining direct sensory realism (**b**). This criticism was put forward earlier by Peter John Olivi (**c**). Olivi and Ockham refer to a representationalist theory which deviates from the way in which the species theory was usually understood. See Tachau 1988, 39–54; Pasnau 1997, 168–181. Later medieval authors did not find Ockham's position convincing and defended the theory of the spirits; John Buridan, *Quaestiones in De anima* II.16–18; Nicole Oresme, *Quaestiones in De anima* II.18; Peter of Ailly, *Tractatus de anima* 9, ed. Pluta, 45–51; Bartholomaeus Arnoldi of Usingen, *Parvulus philosophiae naturalis* (Leipzig 1499), 95r–96r; Jodocus Trutfetter, *Summa in totam physicen* (Erfurt 1514), Z6v–Aar; Aa2rv. Oresme criticizes a theory which assumes that sensations presuppose only corporeal changes (**d**); the primary qualities mentioned in the quotation are those of touch (3.3.4, 49). Oresme may refer to the atomist ideas of perception discussed by Nicholas of Autrecourt. See Grellard 2009.

9 Taste and Touch

a. We perceive tangible qualities which exceed the mean state between contrary tangibles in which this sense properly consists ... For in the case of vision, the organ is in potency to black and white, being free from the whole genus of black and white, for it is colourless. But the organ cannot be free from the whole genus of hot and cold, or wet and dry because it is composed of elements having these as qualities. Rather, the organ of touch is in potency to its objects insofar as it is a mean between contraries because the mean is in potency to the extremes. (Thomas Aquinas, *Sentencia libri De anima* II.23 (167))

b. In the genus of tangible qualities, there are several primary per se contraries which are all reduced to one subject in a way, but in another way they are not ... if we are speaking of the subject as the genus, it is clear that there is no one same subject for all tangible qualities. But speaking of the subject as the substance, there is one subject for all these, namely the body which pertains to the constitution of an animal ... Hence, formally and conceptually speaking, the sense of touch is not one but many, but it is one according to the subject. (Thomas Aquinas, *Sentencia libri De anima* II.22 (161))

c. The varieties of flavour are especially clear to us because a human being has a more exact sense of taste than other animals, taste being a kind of touch, and a human being has the most exact sense of touch among animals (Thomas Aquinas, *Sentencia libri De anima* II.19 (148–149)).

d. Touch apprehends many things that differ in kind as much as the objects of various senses, such as heavy and light, hot and cold, moist and dry, hard and soft, dense and fine, and also manifold dispositions and indispositions of the organ itself and of the whole body; for we seem to sense by touch catarrhal indigestions, swellings, and suppurations, feverish heats, the inanity and the needs of the body, as well as its fullness in satiety and, further, the various itches of the flesh, the agile mobility or the opposite tardiness of the members, their enduring strength or flimsy weakness, their wounds or integrity, and the pains and pleasures which they cause. (Peter John Olivi, *Quaestiones in secundum librum Sententiarum* 61 (II, 574))

Aristotle makes the flesh the medium of touch and taste, and he argues that the organs of these are internal. Aquinas says that the organ of touch pervades the whole body (*Sentencia libri De anima* II.19 (149)), but he also argues that the flesh is the medium and, referring to *De sensu* 439a1–2, that the ultimate organ of touch is close to the heart (*In De sensu et sensato* 5, 74–76). While the distinction between the organ and the medium remains somewhat unclear, Aquinas states that the organ of touch registers tangible deviations from the mean between tangible contraries, which is found in the organ or medium of touch (**a**). Following Avicenna (*Liber de anima* I.5.77–78 (ed. van Riet, 84–85); II.3.3–4 (ed. van Riet, 138)) or Averroes (*Commentarium magnum in Aristotelis De anima libros* II.108, 116 (298, 312)), many authors referred to the nerves as the organ of touch. (See, for example, Albert the Great, *De anima* II.3.31–34 (142–147); *Quaestiones in Aristotelis De anima*, ed. Bazán, II.21 (450–451); John Duns Scotus, *Quaestiones super De anima* 2 (14–17)). In Aristotle's *De anima* II.11, the proper objects of touch are wet and dry, hot and cold, and hard and soft. Avicenna adds the pair of rough and smooth and argues that perceiving these contraries could be regarded as the task of four senses which have a joint organ (see **1** above). The question of whether touch is a single sense was popular throughout the middle ages. Aquinas sees unity

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in the fact that the objects are the qualities of the elements which constitute the animal body (**b**). Following Aristotle, Aquinas believes that the human sense of touch is the most exact among animals. This is a sign of the general sensitivity and well-balanced physical constitution of human beings – both features are regarded as purposeful for intelligent animals. Many animals see, hear, and smell better than humans, but this does not imply that their sensitivity as a whole is finer (*Sentencia libri De anima* II.19 (149)). Taste is more related to touch than other senses. Consequently it is also more acute in humans than in other animals (**c**). Peter John Olivi wanted to enlarge the scope of touch by referring to various inner states of the body in the opening of a chapter on touch (**d**). See Yrjönsuuri 2008a.

10 Intention and the Objective Being of Sensory Content

a. However much the cognitive power is informed by a habit and a species, which differ from the cognitive act, it cannot proceed to a cognitive act if it does not first actually tend toward the object, so that the gaze of its intention is actually turned and directed to the object. (Peter John Olivi, *Quaestiones in secundum librum Sententiarum* 72 (III, 9))

b. A cognitive act and aspect is directed to the object, and absorbs the object into itself in an intentional way. Therefore a cognitive act is called both the apprehension of an object, and the apprehensive extension to an object. In this extension and absorption, the act is intimately conformed and configured to the object. The object presents itself or shows itself as present to the cognitive aspect, and there is a kind of representation of it by the act which is configured to it. (Peter John Olivi, *Quaestiones in secundum librum Sententiarum* 72 (III, 35–36))

c. For the cognitive power must not only receive the species of the object, but also tend through its act toward the object. This second is more essential to the power since the first is required because of the imperfection of the power. And the object is the object because the power tends to it rather than because it impresses a species. (John Duns Scotus, *Quaestiones super libros Metaphysicorum Aristotelis* VII.14, n. 29)

d. The second experience is the rapid circular motion of a stick in the air, for such a moving stick seems to create a circle in the air. It is therefore asked, what is this circle which appears to the observer. Either it is really in the stick, but this cannot be the case, since the stick is straight, or it is something in the air, but this is even more unlikely, for a coloured and definite circle cannot exist in the air. It also cannot be the sight, because then the sight itself would be seen, and furthermore the

sight is not in the air where this circle appears to be. It also cannot be anywhere inside the eye, for the same reasons. Therefore, it remains that it is in the air, having an intentional or apparent being when it is judged and seen. (Peter Auriol, *Scriptum Super Primum Sententiarum* 3.14 (696–697))

e. If two people see or understand the same thing and one of these has a more clear vision or understanding, they do not see the same about the thing; one sees a more bright whiteness where the other sees a dim whiteness, even though the whitenesses are one whiteness in subjective being. That which they try to see when attending to the object is numerically one in subject, though it comes to them according to a different objective being. (Nicholas of Autrecourt, *Exigit ordo* 262.4–11)

The species theory which was meant to explain the actualization of the potency was not helpful with respect to the intentionality of sensory experience, as was stressed by Peter John Olivi and Duns Scotus. Olivi applies the Augustinian terminology in his theory that the soul is capable of attending directly to external objects without mediating species (**a–b**; see Perler 2002, 108–146; Silva and Toivanen 2010). Scotus tried to combine the causal approach with his conception of the active perception (**7** above) and phenomenological intentionality (**c**). Particularly influential in early modern times also was Scotus's idea that the cognised things have an objective or intentional being when they are represented in the cognitive faculty; see p. 278 below. Peter Auriol taught that the objective being and real being overlapped except in the exceptional cases of misperceptions and illusions (**d**). While this distinction was not meant to imply a systematic gap between appearance and reality, it led to discussions of perceptual scepticism. Nicholas of Autrecourt seems to represent a phenomenalist theory which separated the objective being in perception and real subjective being in things (**e**). See also Grellard 2005.